TG 13850 v07.02
Summary of Changes

Reasons for Changes:

- Class A, Style Z, Notification Appliance circuits are not typically specified due to cost associated with providing the return signal loop to the fire alarm control panel. In all of our fire alarm projects we are providing Class B, Style Y, Notification Appliance Circuits that terminates at the last device with an end-of-line resistor. These circuits are accepted by the AHJ.
- Clarification on fire alarm system power conductor placement within raceways and cables.
- Other minor housekeeping corrections to footer, font and version numbers.

See Mark up below:

SECTION 13851 - ADDRESSABLE FIRE ALARM SYSTEM

2.02 SYSTEM DESIGN (Partial)

A. System Operation: System shall be a complete, supervised, noncoded, addressable multiplex fire alarm system conforming to NFPA 72. The return portion of the loop shall be remote from the supply portion of the loop. The system shall operate in the alarm mode upon actuation of any alarm initiating device. The system shall remain in the alarm mode until all initiating device(s) are reset and the fire alarm control panel is manually reset and restored to normal. The system shall provide the following functions and operating features:

1. The FACP and fire alarm control units, if used, shall provide power, annunciation, supervision and control for the system.

2. Provide Class B, Style B, initiating device circuits.

3. Provide Class B, Style 4, signaling line circuits.

4. Provide Class BA, Style YZ, notification appliance circuits.

J. Addressable Interface Devices: The addressable monitor device shall provide an addressable input interface to the FACP for monitoring normally-open or normally-closed contact devices such as **<alarm pressure switches>**, waterflow switches, <valve supervisory switches>, fire pump monitoring, independent smoke detection systems, etc. The addressable control device shall provide an addressable output interface to the FACP for control of elevator recall, door releasing, solenoid activation, etc.

1. Addressable Monitor Modules: Addressable Monitor Module shall be provided to connect supervised conventional initiating device or zone of supervised conventional initiating devices, including but not limited to water flow and alarm pressure switches, valve tamper switches, low pressure switches, manual release stations, and heat detectors, and other such devices ~~to one of the 2 wire intelligent analog loop cards~~. Monitor module shall mount in a 4 inch square, 2-1/8 inch deep electrical box and shall be capable of Style B supervised wiring to the initiating device. Monitor module shall provide address setting means switches and store an internal identifying code which the control panel shall use to identify the type of devices. Monitor module shall contain an integral LED that flashes each time the monitor module is polled.

O. Fire Alarm Power Extender Panels: Fire alarm power extender panel shall comply with the applicable requirements of UL 864. Panel shall be modular, installed in a **<flush>**

<surface>-mounted steel cabinet with hinged door and cylinder lock. The extender panel(s) shall have the necessary components and equipment required to provide a minimum of **<four>** ***[_____]*** supervised, Class ~~A~~B, Style ~~Z~~Y, notification appliance circuits. Each appliance circuit shall be rated for 1.5 amperes at 24 volts DC. An alarm signal from the FACP will initiate the **<four>** ***[___]*** notification appliance circuits to extend the alarm. Primary power for the panel shall be 3 amperes at 120 volts AC. Standby power shall be same as FACP and charger shall be housed integrally within the cabinet.

P. System Wiring: Provide wiring materials under this section as specified in Section **<16100 - ELECTRICAL WORK>** with the additions and modifications specified herein.
   1. Wiring Within Cabinets, Enclosures, Boxes, Etc.: Provide wiring installed in a neat and workmanlike manner and installed parallel with or at right angles to the sides and back of any box, enclosure or cabinet. All conductors which are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting or junction box shall be connected to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make all connections with approved pressure type terminal blocks, which are securely mounted.

   2. Terminal Cabinets: Provide a terminal cabinet **<at the base of any circuit riser,> <on each floor at each riser,> <and>** where indicated on the drawings. Terminal size shall be appropriate for the size of the wiring to be connected. All conductor terminations shall be labeled and a drawing containing all conductors, their labels, their circuits and their interconnection shall be permanently mounted in the terminal cabinet. Minimum size is 8 inches high by 8 inches wide.

SPECIFIER'S NOTES: Central Services Division prefers stranded in lieu of solid copper conductors for systems they will maintain. Verify type of conductors to be used and edit this Article accordingly.

   3. Above Grade Alarm Wiring: Conductors shall be Type THHN/THWN. Type TW is not permitted. Signaling line circuits and initiating device circuit field wiring shall be twisted pair No. 18 to No. 12 AWG, depending on distance and per manufacturer's recommendations. Visual alarm signal and audible appliance circuits shall be single solid copper No. 14 AWG size conductors at a minimum. Speaker circuits shall be solid copper No. 16 AWG size conductors at a minimum. Wire size shall be sufficient to prevent voltage drop problems. Power wiring, operating at 120 VAC minimum, shall be No. 12 AWG solid copper having similar insulation. Provide wiring in electrical metallic tubing in dry locations not enclosed in concrete or where not subject to mechanical damage. Provide rigid conduit in all other locations. Conceal conduit in finished areas of new construction and wherever practicable in existing construction. The use of flexible conduit not exceeding a 6 foot length shall be permitted in initiating device circuits. The minimum conduit size shall be 0.75 inch. ~~All Class A, Style Z circuits shall have the return loop (homerun) for the wires to the fire alarm control panel in separate conduit.~~ Shielded wiring shall be utilized where recommended by the manufacturer. For shielded wiring, the shield shall be grounded at only one point, which shall be in or adjacent to the FACP. T-taps are permitted in Style 4 circuits with interconnections occurring on terminal strips. Circuits to **<smoke control systems,> <fan shutdown systems,> <door locking systems,>** and ***[_____]*** shall terminate in terminal cabinets within 3 feet of the controllers for those systems. The completion of those circuits from the terminal cabinets to the appropriate system shall be provided under the appropriate Division.

3.03 INSTALLATION

E. Cables and Conductors:
   1. Below Grade Cable Installation: Cable shall be installed as indicated on the drawings.

a. Conduits shall be sloped as noted on the drawings to provide drainage at handholes and manholes.

b. Cables shall not be installed in the same ducts, conduits, handholes, etc. with non-fire alarm circuits.

c. Align and clean ducts and conduits before cable installation using mandrels, and scrapers and wire brushes. Arrange with the Contracting Officer to have an inspector present for conduit and duct cleaning, and cable installation.

d. Properly sized tensiometer and pulling devices shall be used for cable installation. Jerking of cables during the pulling installation process shall not be allowed.
   1) At the request of the Contracting Officer, the Contractor shall provide proof and date of calibration of the tensiometer and cable pulling devices used.

   2) Cable pulling tensions shall not exceed manufacturer's recommended pulling tensions.

   3) Use cable lubricants and compounds that will neither change the physical characteristics nor increase the conductor insulation dielectric constants of the cable sheath.

e. Should the Contractor proceed with conduit cleaning and cable installation without having notified the Contracting Officer, if directed by the Contracting Officer, the Contractor shall remove the cable(s) for inspection and reinstall at no additional cost to the State.
   1) The Contractor may reinstall the removed cable if inspection and/or tests show no cable damage.

   2) If the cable is damaged, the Contractor shall install a new replacement cable at no additional cost to the State.

2. Above Grade Conductor Installation:
   a. Conductors shall not be installed in the same conduits, ducts, junction boxes, etc. with non-fire alarm circuits. 120 volt AC fire alarm circuit conductors shall not be ~~in~~ contained within the same multi-conductor cable nor installed with cables and other conductors in the same conduits, ducts, enclosures, junction boxes, etc. with 24 volt DC fire alarm circuits.

END OF SECTION 13851 MARK-UP

SECTION 13852 - HARD WIRED FIRE ALARM SYSTEM

2.02 SYSTEM DESIGN

A. System Operation: System shall be a complete, supervised, manual <and automatic,> zoned, annunciated, fire alarm system conforming to NFPA 72. The return portion of the loop shall be remote from the supply portion of the loop. Provide separate circuits from the control panel to each zone of initiating devices as specified herein. Transmission of signals from more than one zone over a common circuit to the control panel is prohibited. The system shall operate in the alarm mode upon actuation of any alarm initiating device. The system shall remain in the alarm mode until all initiating device(s) are reset and the fire alarm control panel is manually reset and restored to normal. The system shall provide the following functions and operating features:

1. The FACP and fire alarm control units, if used, shall provide power, annunciation, supervision and control for the system.

2. Provide Class B, Style B, initiating device circuits.

3. Provide Class BA, Style YZ, notification appliance circuits.

L. Fire Alarm Power Extender Panels: Fire alarm power extender panel shall comply with the applicable requirements of UL 864. Panel shall be modular, installed in a **<flush> <surface>**-mounted steel cabinet with hinged door and cylinder lock. The extender panel(s) shall have the necessary components and equipment required to provide a minimum of **<four> *[_____]*** supervised, Class AB, Style ZY, notification appliance circuits. Each appliance circuit shall be rated for 1.5 amperes at 24 volts DC. An alarm signal from the FACP will initiate the **<four> *[_____]*** notification appliance circuits to extend the alarm. Primary power for the panel shall be 3 amperes at 120 volts AC. Standby power shall be same as FACP and charger shall be housed integrally within the cabinet.

M. System Wiring: Provide wiring materials under this section as specified in Section **<16100 - ELECTRICAL WORK>** with the additions and modifications specified herein.

1. Wiring Within Cabinets, Enclosures, Boxes, Etc.: Provide wiring installed in a neat and workmanlike manner and installed parallel with or at right angles to the sides and back of any box, enclosure or cabinet. All conductors which are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting or junction box shall be connected to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make all connections with approved pressure type terminal blocks, which are securely mounted.

2. Terminal Cabinets: Provide a terminal cabinet **<at the base of any circuit riser,> <on each floor at each riser,> <and>** where indicated on the drawings. Terminal size shall be appropriate for the size of the wiring to be connected. All conductor terminations shall be labeled and a drawing containing all conductors, their labels, their circuits and their interconnection shall be permanently mounted in the terminal cabinet. Minimum size is 8 inches high by 8 inches wide.

SPECIFIER'S NOTES: Central Services Division prefers stranded in lieu of solid copper conductors for systems they will maintain. Verify type of conductors to be used and edit this Article accordingly.

3. Above Grade Alarm Wiring: Conductors shall be Type THHN/THWN. Type TW is not permitted. Initiating device circuit field wiring shall be single solid copper conductor No. 18 to No. 12 AWG, depending on distance and per manufacturer's recommendations. Visual alarm signal and audible appliance circuits shall be single solid copper No. 14 AWG size conductors at a minimum. Wire size shall be sufficient to prevent voltage drop problems. Power wiring, operating at 120 VAC minimum,

shall be No. 12 AWG solid copper having similar insulation. Provide wiring in electrical metallic tubing in dry locations not enclosed in concrete or where not subject to mechanical damage. Provide rigid conduit in all other locations. Conceal conduit in finished areas of new construction and wherever practicable in existing construction. The use of flexible conduit not exceeding a 6 foot length shall be permitted in initiating device circuits. The minimum conduit size shall be 0.75 inch. ~~All Class A, Style Z circuits shall have the return loop (homerun) for the wires to the fire alarm control panel in separate conduit. T-taps are not permitted in Class A circuits.~~ Circuits to **<smoke control systems,> <fan shutdown systems,> <door locking systems,>** and ***[_____]*** shall terminate in terminal cabinets within 3 feet of the controllers for those systems. The completion of those circuits from the terminal cabinets to the appropriate system shall be provided under the appropriate Division.

3.03 INSTALLATION

E. Cables and Conductors:
   1. Below Grade Cable Installation: Cable shall be installed as indicated on the drawings.
      a. Conduits shall be sloped as noted on the drawings to provide drainage at handholes and manholes.

      b. Cables shall not be installed in the same ducts, conduits, handholes, etc. with non-fire alarm circuits.
      c. Align and clean ducts and conduits before cable installation using mandrels, and scrapers and wire brushes. Arrange with the Contracting Officer to have an inspector present for conduit and duct cleaning, and cable installation.

      d. Properly sized tensiometer and pulling devices shall be used for cable installation. Jerking of cables during the pulling installation process shall not be allowed.
         1) At the request of the Contracting Officer, the Contractor shall provide proof and date of calibration of the tensiometer and cable pulling devices used.

         2) Cable pulling tensions shall not exceed manufacturer's recommended pulling tensions.

         3) Use cable lubricants and compounds that will neither change the physical characteristics nor increase the conductor insulation dielectric constants of the cable sheath.

      e. Should the Contractor proceed with conduit cleaning and cable installation without having notified the Contracting Officer, if directed by the Contracting Officer, the Contractor shall remove the cable(s) for inspection and reinstall at no additional cost to the State.
         1) The Contractor may reinstall the removed cable if inspection and/or tests show no cable damage.

         2) If the cable is damaged, the Contractor shall install a new replacement cable at no additional cost to the State.

   2. Above Grade Conductor Installation:
      a. Conductors shall not be installed in the same conduits, ducts, junction boxes, etc. with non-fire alarm circuits. 120 volt AC fire alarm circuit conductors shall not be contained within ~~in~~ the same multi-conductor cable nor installed with cables and other conductors in the same conduits, ducts, enclosures, junction boxes, etc. with 24 volt DC fire alarm circuits.

END OF SECTION 13852 MARK-UP